

Methods of Investigation of Heat and Mass Transfer Parameters in Porous Media

A.A. Lipayev ^{C, S}

Department of Development of Oil and Gas Fields, Almet'yevsk Oil Institute, Tatarstan, Russia

The study considers experimental research methods on heat and mass transfer parameters in porous media such as rock layers. The method is based on the natural laws of forming and diffusing of temperature waves in a system of contacting bodies such as the sample examined in the form of a plate and two semi-bound media in contact with it. On the basis of this thermal scheme, methods and a multipurpose instrument for measuring thermal conductivity, thermal diffusivity and heat capacity under conditions of high pressures, temperatures and fluid filtration have been developed.

The instrument includes original and standard components:

- replaceable working cells for different materials and types of research;
- a chamber for high pressure with a separate system of forming axial, lateral and internal pressures of the pores;
- an outer thermostat
- a device for fluid migration control;
- a computer for controlling the experiment and processing the data obtained.

With the help of the above- mentioned instrument, investigations of the rock thermal quality under the influence of water filtration, high pressure and temperature have been carried out. The study considers the results obtained from the interpretation of geothermal and other investigations in oil-field practice for optimization of the methods used for the development of heavy highly-viscous and bituminous oil-fields.

The combination of methods and apparatus may find an application in power engineering, the chemical industry and in other branches of science and engineering where investigations of physical phenomena and technological processes connected with heat and mass transfer in permeable materials take place.